Routledge Handbook of World-Systems Analysis

Salvatore J. Babones, Christopher Chase-Dunn

Forests, food and freshwater

Publication details

Rebecca Clausen, Stefano B. Longo
Published online on: 24 May 2012

How to cite: Rebecca Clausen, Stefano B. Longo. 24 May 2012, Forests, food and freshwater from: Routledge Handbook of World-Systems Analysis Routledge
Accessed on: 14 Sep 2023

PLEASE SCROLL DOWN FOR DOCUMENT

Full terms and conditions of use: https://www.routledgehandbooks.com/legal-notices/terms

This Document PDF may be used for research, teaching and private study purposes. Any substantial or systematic reproductions, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The publisher shall not be liable for an loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.
13. The environment
13.2

Forests, food and freshwater
A review of world-systems research and environmental impact

Rebecca Clausen and Stefano B. Longo

World-systems analysis provides a theoretical foundation for researching the underlying social causes of environmental impacts. This theoretical approach has offered a wealth of insight into the historical and current relationships between human societies and their environment. Drawing originally from the work of Wallerstein (1974) and Braudel (1972, 1973), the world-systems framework provides a global political economic perspective necessary for understanding the degradation and depletion of crucial environmental systems and resources. This contribution has been significant in the examination of the environmental and social dynamics of deforestation, the developments in the global agri-food system, and water pollution and consumption. This chapter will review the vibrant world-systems literature that relates to these environmental impacts.

Deforestation

The extraction of natural resources from the periphery has long been a part of capitalist development in the core. The global inequality of environmental impacts is especially evident in patterns of deforestation. As a global trend, forest loss disproportionately occurs in the less developed countries. Paradoxically, the highest forest product consumption occurs in the developed nations. While this dynamic is related to the fact that core nations have already undergone extensive deforestation, there are other important global processes that contribute. World-systems theory is a crucial tool for understanding how the unequal ecological impacts of deforestation are related to international inequality in production, consumption, trade, and capital accumulation.

Bunker (1984, 1985) first applied world-systems analysis to understand the driving forces of tropical deforestation. Bunker’s research examined the deforestation of the Brazilian Amazon to describe how the modes of resource extraction in the extreme periphery lead to further underdevelopment of societies. He explained that while the processing of most natural resources creates additional value, extreme peripheries such as the Amazon tend to export raw forest products and the creation and realization of profit and benefit occurs in the core (Bunker 1984). This is not a sovereign choice; rather, it is one dictated by the economic ties to the world capitalist system. The global organization of production that favors raw material exports often degrades the natural resources of a nation, undermines future development, and concentrates land-holdings and capital.
into commercial interests. Bunker’s (1984) research inspired world-system theorists to “consider the effects of the exploitation of labor and the exploitation of entire ecosystems as separate but complementary phenomena, both of which affect the development of particular regions” (1053).

Early world-systems analysis of deforestation offered a critical refinement to the claim that population alone drives forest decline. Rudel (1989) tested the Malthusian claim that population growth is a primary driver of deforestation. This research demonstrated that population does have an effect on rates of forest loss; however, in some instances capital investment interacts with local population growth to accelerate deforestation. As one of the first empirical investigations of deforestation, this study prompted further inquiry into socioeconomic processes within the world-system that perpetuate environmental impact.

Burns et al (1994) specified the patterns of deforestation by providing exploratory investigation of the demographic, cultural, and economic factors that may lead to forest decline. The authors claimed that social dynamics leading to deforestation operate differently across the structural settings of the core, semiperiphery, and periphery nations within the world-system. Their results attested to this by finding that deforestation had been the most severe in semiperiphery nations during the latter half of the twentieth century. This was due in part to rural encroachment in these regions, combined with access to advanced tree-cutting machinery and low forestry regulation. Kick et al (1996) continued this line of inquiry, confirming that rates of deforestation tend to vary markedly by a country’s position in the world-system. The attention to world-system position as causal indicator of forest loss was a key development in this area of research.

Chew (2001) used deforestation measures over a broad sweep of history as an indicator of civilizations’ ecological degradation (3000 BCE–CE 2000). He claimed that for 5000 years, societies have used wood to meet the expansionary dynamics of societies connected through trade linkages, facilitating the process of accumulation in world history. His historical survey concludes, “Trees, therefore, have fueled the socioeconomic transformation of every societal system, and for some have provided the means to become the core centers of the world-system” (2001: 4). Sparked by this early comparative historical work (Bunker 1984; Chew 2001; Rudel 1989), world-systems scholars began to advance empirical, cross-national studies of ecologically unequal exchange.

Within the past decade, world-system analysis of deforestation has produced more sophisticated, theoretically driven models. In 2003, the Journal of World-Systems Research sponsored a special issue titled “Globalization and The Environment,” edited by Edward Kick and Andrew Jorgenson. This issue signaled the recognition of the important contributions that world-systems research was making to the study of environmental problems in general. In this issue, Burns et al (2003) make a convincing argument that global hierarchies must contextualize world-systems research of deforestation. The authors include boreal, temperate, and tropical forests in their study, and find that social factors most closely associated with deforestation vary by world-systems position.

World-systems analysis of deforestation has had a significant role in the academic debate concerning modernization and the environment. Early research into this area suggested that modernization processes, such as economic growth and urbanization, may have more impact on deforestation than world-systems processes of debt, trade, and foreign capital penetration. Ehrhardt-Martinez et al (2002) expanded this argument further to conclude that rates of deforestation may decrease as ecological modernization advances, with environmental impact being gradually alleviated by continued economic prosperity and global economic integration. These quantitative studies challenged the claims that deforestation was related to world-systems factors and sparked healthy debate and refinement within the field.

Numerous world-systems studies have made convincing arguments contesting the propositions of the ecological modernization perspective. Roberts and Grimes (1997) argue that if there is...
a point at which continued economic growth begins to decrease forest loss, it is probably quite high and will not be reached by most countries across the world. Numerous other scholars have established robust, empirically driven research programs investigating the relationships between world-systems processes (trade, debt, foreign investment) and patterns of deforestation. Jorgenson (2006a) proposed a structural theory of unequal ecological exchange, integrating theoretical perspectives of world-systems theory and environmental sociology. Unequal ecological exchange suggests, “developed countries with higher levels of resource consumption externalize their consumption-based environmental costs to less developed countries, which increase levels of environmental degradation within the latter” (Jorgenson 2006a: 691). The unequal trade relations are facilitated by the strategies of local elites attracting investors and through the direct control of transnational corporations.

Jorgenson (2006a) confirmed the theory of unequal ecological exchange by analyzing deforestation trends based on a new methodological indicator—the “weighted index of vertical trade.” By operationalizing unequal ecological exchange, the weighted index of vertical trade allowed Jorgenson to model environmental impact (i.e., deforestation rates) based on the relative extent to which exports are sent to more developed countries, and the characteristics of those receiving nations. This methodological development has allowed other scholars to investigate the relationships between commodity-specific exports and rates of deforestation (e.g., Austin 2010).

Recent studies on the structural drivers of deforestation attempt to specify previous findings concerning deforestation, population, and economic integration. Jorgenson et al (2007) advanced understandings of the relationship between population and deforestation by disaggregating the effects of total population into the particular characteristics of rural and urban population change. The authors found that growth in rural population increases deforestation, and they relate these changes to larger processes of export-oriented development. Similarly, Jorgenson (2008) contextualized previous work on economic integration by finding that less-developed countries with higher levels of foreign investment exhibit great rates of deforestation. Further, Jorgenson (2010) explains how the foreign investment dependence allows developed countries to treat less developed countries as “supply depots” to satisfy their unsustainable levels of natural resource consumption.

Shandra et al (2008) provide further insight into the relationship between deforestation and global hierarchies by focusing attention on national debt. The authors extend prior work by considering the impact of structural adjustment lending to poor nations, and find that the structural adjustment policy reforms required of the indebted nations (increase exports, liberalize trade, cut government spending) are positively associated with forest loss. This finding has timely and relevant implications as social scientists begin to analyze policy proposals such as “debt-for-nature” swaps. Findings that confirm the negative impacts of structural globalization on forests add further support to the theory of unequal ecological exchange, and contribute to the growing body of “ecostructural” analysis within world-systems research (Jorgenson et al 2007).

In addition to researching the root causes of forest degradation, world-systems theorists also investigate the global mechanisms that may reduce deforestation. These studies add a layer of complexity to demonstrate the contradictory nature of globalization processes in general. As discussed, in many instances, global integration leads to inequalities of environmental impact. World polity hypothesis, however, states that institutions may play important roles in the global processes of world-systems dynamics by mediating environmental decision-making and sparking local social movements to demand forest protection. These institutions include international non-governmental organizations (INGOs), inter-governmental organizations (IGOs), and treaties.

Shandra and colleagues have dedicated much of their research to understanding which aspects of world polity theory may reduce deforestation. Shandra (2007a, 2007b) found that nations that are more embedded in global political relationships of all types (INGOs, IGOs, treaties) have less
deforestation. These findings support the world polity theory that “behaviors of nations are shaped by pressures that can be put on them through their ties to a wide array of international organizations (Shandra 2007a: 22). Additionally, Shandra (2007b) found that INGOs are able to be more effective in reducing deforestation in nations with higher levels of democracy. In contrast, repression within a nation interacts with various world-systems measures, increasing deforestation in nations with higher indicators of repression (Shandra 2007c). Shandra and colleagues provide important contextualization of how global integration may invite or deter political institutions to redefine national policy in the service of environmental sustainability.

**Agri-food systems**

The role of food production and consumption has been another important area of research for world-systems scholars. The research has grown out of a number of historical analyses on the political economy of food production and food systems. Inspired by Wallerstein’s seminal works (Wallerstein 1974, 1980), these analyses examine the global division of labor and the global dynamics of power represented in the establishment of the modern world-system and within the production and consumption of agri-food products.

In short, the unequal division of labor that emerged in the modern world-system is reflected in the global division of wealth and power. A close historical examination of food production and consumption opens a window into the social organization of the world-economy. While an analysis of agri-food concerns was initially marginalized in world-systems research by a focus on the expansion of industrialization and factory production, by the 1980s, analyses investigating the inherent power of food (McMichael 2000) and agri-food concerns began to provide essential insight into social organization and modern institutions of political economic and military power.

Mintz’s classic work *Sweetness and Power* (Mintz 1985) provided an analysis of the fundamental role of sugar production in making the modern world. Mintz (1985) took on a deep historical study of a single product and unlocked the myriad relationships between the expansion of modern capitalist regimes with culture, colonialism, exploitation of humans, and land in the periphery. The work provides insight into the fundamental nature of agri-food production and consumption processes and the modern organization of world culture, economic processes, and military power.

Studies such as this were concurrent with a wealth of research on the interaction between food production and consumption and the development of the modern world-system. During the 1980s and 1990s, the growth of neoliberal policies and their impacts on the global food systems sparked new research programs in agriculture and food systems (Buttel 2001; Buttel et al 1990). The significant changes that restructured the food system after World War II prompted deep analyses by scholars (McMichael 1994). The sociology of agriculture led by scholars such as Harriet Friedman, William Friedland, Philip McMichael, and others, established numerous historical and systems analyses that drew on neo-Marxist political economy and world-systems research to examine agri-food systems, state-policies, globalization, development and, broadly, social life.

Friedland (1984, 2004) pioneered work in commodity systems and commodity chains, which established a new direction in agri-food studies. This approach presented the networks of production and trade in relation to organizations, labor, the application of science and technology, and distribution systems, resulting in innovative research on globalization and food. A commodity chain analysis looks at the interwoven chains of production within the world-system, rather than discrete nations, as points of production and consumption. That is, they are not contained within political boundaries and should not be analyzed as if they are (Gereffi and Korzeniewicz 1994). As a result, this approach originated a methodology that focused on the production system and commodity production within a global system.
Commodity chain research on food items (e.g., coffee [Talbot 2002, 2004], salmon [Phyne and Mansilla 2003], grain flour [Pelizzon 1994], produce [Goldfrank 1994], or shrimp [Skladany and Harris 1995]) can highlight the social relationships within the commodity production process, as well as between numerous chains, and the interactions within the broader dynamic of the modern world-system. Since the onset of global capitalism, core nations have directed agri-food production. Thus commodity chain research has revealed the hierarchical structure of global agri-food production, consumption, and trade (Bonanno et al 1994; Gereffi and Korzeniewicz 1994; McMichael 1995). Further, these analyses have brought to light the increasing role of transnational corporations and concentration of ownership in the agri-food sector, intensification of operations, and a reducing role of the state in recent decades (Heffernan and Constance 1994; Skladany and Harris 1995; Stringer and Le Heron 2008).

Complimenting the work in commodity chains, the concept of “food regimes” emerged during a similar period (Friedmann 1993; Friedmann and McMichael 1989; McMichael 2009; McMichael and Buttel 1990). This research focused on the changing power structures and development strategies that dominated the world economic order with the growth of capitalist social institutions. Placing agri-food production in a world historical perspective, the conceptual strength of food regime research underlines the role of global power structures in dictating the form and direction of agri-food production and consumption. Further, this analytical perspective has revealed an important crisis and contradiction within the existing global food order and provided a necessary critique to the modern development paradigm advanced in the post-World War II era (Friedmann 1993; McMichael 1994, 2000).

The historical work on food regimes developed a critical analysis of international food systems through examining the convergence of state policy and geo-politics of food and food aid, researching its role within the larger global political economic and military arrangements (McMichael 2009). This approach “links international relations of food production and consumption to forms of accumulation broadly distinguishing periods of capitalist transformation” (Friedmann and McMichael 1989: 95).

In 1993, the Political Economy of the World-Systems (PEWS) conference in Ithaca, New York, focused on food and agriculture systems in the world-economy. Both the commodity chain analysis and the food regime approach influenced a great deal of work in world-systems studies, making a central contribution to the conference (McMichael 1995). The expansion of transnational corporate control of the global agri-food system, increasing power of industrial agriculture and the real and potential consequences for the periphery has been clearly documented by developing analyses informed by a world-systems perspective. A more recent concern associated with this transformation in agri-food production addresses the variety of environmental and health problems, such as the increasing use of synthetic chemicals, soil erosion, climate change, and deforestation, among other issues.

Moore (2000, 2003) has expanded on these concerns using a world-systems perspective along with the metabolic rift approach, hence including a necessary ecological critique. Integrating the works of Wallerstein and Marx, Moore (2000) uses the concept of “systemic cycles of agro-ecological transformations” to develop a conception of the growth of the capitalist world-system with both political economic and ecological transformations. Thus, according to this approach, the modern ecological crisis is rooted in the transition to capitalism during the long sixteenth century, and the social relations of production that took shape. This work and others in the world-systems perspective emphasize the historical significance of the dialectic between nature and capital over the longue durée. In doing so, these studies have produced important contributions to our understanding of food production and ecology in the crisis of feudalism and the emergence of capitalism (Moore 2003; Myrdal 2007).
Along with the influential theoretical and historical analyses, world-systems scholars have made important contributions to the study of food and agriculture systems by developing empirical studies, principally through employing cross-national quantitative analyses. For example, these studies have examined the interrelationships between agriculture production, global trade, foreign direct investment, and ecological degradation.

The uses of fertilizers and pesticides have long been known to impact human health and contribute to ecological disruptions. Thus, world-systems researchers have examined the relationships between foreign investment and fertilizer and pesticide consumption (Jorgenson 2007; Jorgenson and Kyukendall 2008). These studies find a positive relationship between the infusion of foreign capital and environmentally harmful practices in periphery nations (Jorgenson 2007; Jorgenson and Kyukendall 2008). Other researchers have found a positive relationship between agricultural export intensity and the consumption of fertilizers and pesticides within a nation (Longo and York 2008). Contrary to modernization theories on the environment that expect expanding international trade and finance to have ecological benefits for nations, these empirical studies found that in general, greater integration into the dynamics of the modern world-system was related to environmentally damaging agricultural practices. This research compliments historical studies by world-systems researchers regarding the increasing use of harmful chemicals, and transfer from the core into the periphery (Frey 1998, 2003).

Freshwater pollution

Access to water is a fundamental necessity for all societies. Water, as a primary source of life, an avenue of transportation, and an input for agriculture production, has shaped and been shaped by the organization of human social life. Scholars working in the world-systems tradition have contributed to documenting the long-term causes and consequences of water resource degradation, and it has been well understood that water is a crucial resource that interacts with a variety of human and environmental concerns (Chew 2001).

Recent cross-national empirical work influenced by the world-systems tradition has begun to unravel the complex role of water use and the effects of water pollution. In a series of studies on macro-structural drivers and consequences of water pollution, world-systems scholars have found important relationships between global political economic processes, water pollution, and infant mortality (Burns et al 2003; Jorgenson and Burns 2004). Specifically, nations that have high levels of export commodity concentration also tend to have high levels of water pollution, and there is a significant relationship between higher levels of organic water pollution and infant mortality rates. This research program examines the ways that nations of the global South have been disproportionately burdened with the impacts of water pollution due to their position in the global economic order (Jorgenson 2006b). As a result, pollution of this essential resource can have devastating consequences for the most vulnerable people in the poorest nations of the world.

Other researchers have begun to examine the ways that socio-structural processes impact water withdrawals, combining a world-systems view with the human ecology tradition in environmental sociology (Longo and York 2009). However, this area of research is still in its preliminary stages. As water scarcity and water pollution continue to impact societies around the world, it is clear that world-systems scholars need to do more to understand the ways in which history, the world-economy, and inequality affect use and access to this precious resource.

Conclusion

The vast literature exploring world-systems analysis of environmental impact highlights two primary themes— theoretical specification and empirical sophistication. World-systems scholars...
have fine-tuned original formulations of dependency theory and unequal trade to speak to the specific characteristics of resource extraction and environmental impact. Early comparative case studies have been expanded to now include robust models of cross-national comparison using advanced quantitative methods. Taken together, the theoretical and empirical accomplishments in this field have led to three critical intellectual advances in understanding social drivers of global environmental change.

First, world-systems research has provided mechanisms to describe how environmental resources have influenced the historical development of unequal hierarchies of power between nations. World-systems scholars demonstrate the important historical role of forests (wood products) and agriculture (food) in creating trade relationships and wealth accumulation in the early stages of capitalism. Up until recently, sociologists have often overlooked the role of the environment in socio-historical development. World-systems research of environmental impact fills that gap. Second, world-systems analysis of forests, food, and freshwater allows for crucial specification of contemporary core-periphery processes such as foreign investment, debt, and trade. For instance, scholars demonstrate how increased foreign investment corresponds with increased agricultural pesticide use, increased levels of debt are associated with increased rates of deforestation, and increased export commodity concentration correspond with increased levels of water pollution. Specifying the relations of these processes has proven invaluable in advancing the larger goal of integrating social and natural sciences in the service of sustainability. Finally, world-systems analysis has provided new conceptual tools such as commodity chain analysis and unequal ecological exchange to demonstrate how modernization and economic growth place undue burdens on the world’s most vulnerable people. These conceptual developments have led world-systems scholars to be at the forefront of academic debates surrounding ecological modernization theory, providing clarity and rigor to a critical discussion.

The accomplishments above provide a strong foundation upon which to expand in new directions. World-systems theory could be enriched by a closer relationship with the realities of ecosystems, locating world-systems in a natural world with material and energetic limits (Abel 2007). The new explorations of thought within world-systems theory will continue to represent innovative hypotheses, suggesting that the biophysical earth system and the historical world-system ultimately form a single inseparable whole.

References


